1. Content of the 'Topic Description' document

1.1. Topic area

Pest/vector biology, epidemiology, taxonomy.

1.2. Topic title

Modelling the epidemiology of Flavescence dorée in relation to its alternate host plants and vectors.

1.3. Description of the problem the research should solve

Grapevine Flavescence dorée (FD) is an important grapevine epidemic pathology that causes serious economic damages to grape and wine producers in Europe. It is caused by FD-associated phytoplasmas. Its main vector is *Scaphoideus titanus*, a leafhopper of American origin, now widespread in Europe. The only effective control strategies, beside prevention, are insecticide treatments and uprooting of infected vines. Despite the mandatory control of FD and its vector in all the countries where they are present, and their quarantine status in EU, both the vector and the disease are still spreading to new areas and new European countries. The presence of alternative vectors and host plants was put in evidence in the last years, also thanks to the Euphresco GRAFDEPI project. Other plant- and leafhoppers were found to be able to transmit the etiological agent to grapevine (*Dictyophara europaea* and *Oncopsis alni*), though to a lower extent. Some other leafhoppers, recently introduced to Europe, were found to host the FD phytoplasma, such as *Orientus ishidae*. In addition, the FD phytoplasma was found in other plants than *Vitis* spp., such as *Clematis vitalba* and *Ailanthus altissima*.
These results indicate the necessity to develop a risk analysis system composed from a risk model coupled with a dynamic population model of *S. titanus*, including also the secondary factors affecting FD spreading. This model would be the basis for the evaluation of the epidemiological spread of FD and the efficiency of the possible control strategies (WP2). Moreover, surveillance schemes will be proposed, that should be adapted on the risk analysis system developed and validated in different ecological situations (WP5). Additionally, the development of some habitat management strategies is necessary in relation to the epidemiological relevance induced by the presence and density of alternative vectors and FD host plants (WP5). The importance of the potential alternative vectors will be evaluated by monitoring and studying ecological traits and by transmission experiments (WP4). The WP1 is specific for the project coordination.

1.4. Description of the expected results

Intermediate results:

- Development of protocols for the landscape analysis with the aim to assess the quantitative relation between alternative vectors and landscape composition (FD host plants). Two protocols will be proposed. The first is based on the existing maps of forest species, while the second will be based on the possibility of development of a given species in a specific area (WP5).
- Elaboration of the biological basis for the spread of FD (WP4). Development of a common protocol for the transmission experiments with alternative vectors and transmission experiments with alternative vector species as a basis to assess the epidemiological relevance of the potential vectors. Ecological traits of the alternative vectors and monitoring methods.
- Genetic characterisations of the FD strains collected in the countries (WP3). Survey of alternative host plants and vectors. Relation between FD strains in vineyard-alternative vectors-host plants, with the aim to compare the FD strains present in the symptomatic grapevines with those present in the alternative vectors and host plants.

Final outputs:

- Implementation of risk parameters induced by the presence of alternative vectors and FD-plant hosts in the simulation model for the dynamics of the spread of FD developed by partner AGES. For this output, also the data collected with the Euphresco project 'Study on the diversity of phytoplasmas detected in European forests' (potentially funded through Euphresco in 2016) will be considered (WP2).
- Application of the risk model, surveillance and control strategies (WP5)
- Application of the risk model in different ecological situations.
- Validation of surveillance scheme proposed in GRAFDEPI.
- Development/proposal of habitat management strategies for the control/reduction of the alternative vectors in relation to the cultivar susceptibility.

1.5. Beneficiaries of this research product

- National Plant Protection Organisations, including risk managers
- National and EU policy makers
- Farmers and the grape growing and winemaking sector
- EPPO and its members
- Scientists

1.6. Research funders and research contribution/ distribution

Funding organisation	Research activity and researchers involved
1. Austrian Agency for Health and Food Safety, Austria Sylvia Bluemel sbluemel@ages.at	-Project co-ordination -Risk modelling and application of the spread model. -Ecological traits and monitoring methods. -FD strain typing. -Coordination of the validation of surveillance scheme. -Habitat management strategies. Contact person: Helga Reisenzein helga.reisenzein@ages.at Contact person: Gudrun Strauss gudrun.strauss@ages.at
2. Office Fédéral de l'Agriculture, Switzerland Andreas von Velten andreas.vonfelten@blw.admin.ch	-Protocols for landscape analysis. -Participation in the validation activities. -Survey of alternative host plants and vectors in some areas of Switzerland. Contact person: Mauro Jermini mauro.jermini@agroscope.admin.ch Contact person: Santiago Schaerer santiago.schaerer@agroscope.admin.ch
3. Hrvatski centar za poljoprivredu, hranu i selo, Croatia Mario Bjelis	-Genetic characterisations of the FD strains collected in Croatia (genotyping new and already available isolates).

mario.bjelis@hcphs.hr	-Relation between FD strains in vineyard-alternative vectors-host plants and epidemiological relevance of potential alternative vectors. -Molecular epidemiology studies. Contact person: Jelena Plavec jelena.plavec@hcphs.hr
4. Institut National de la Recherche Agronomique, France Thierry Candresse thierry.candresse@bordeaux.inra.fr	-Contribution to be detailed Contact person: Xavier Foissac xavier.foissac@inra.fr Contact person: Sylvie Malembic-Maher sylvie.malembic-maher@inra.fr
5. Federal Ministry of Food and Agriculture, Germany Bettina Beerbaum Bettina.beerbaum@bmel.bund.de	-Contribution to be detailed Contact person: Michael Maixner michael.maixner@julius-kuehn.de
6. National Food Chain Safety Office Directorate of Plant Protection, Hungary George Melika melikag@nebih.gov.hu	-Contribution to be detailed
7. Consiglio per la ricerca e l'economia agrarian, Italy Luca Riccioni luca.riccioni@crea.gov.it	-Genetic characterisations of the FD strains collected in the countries. -Survey of alternative host plants and vectors in some areas of Italy. Contact person: Elisa Angelini elisa.angelini@crea.gov.it
8. National Insitute for Agricutural and Veterinarian Research, Portugal Leonor Cruz Leonor.cruz@iniav.pt	-Contribution to be detailed
9. Ministry of Agriculture, Forestry and Food, Slovenia Erika Orešek erika.oresek@gov.si	-Genetic characterisations of the FD strains collected in Slovenia. -Survey of alternative host plants and vectors in Slovenia. Contact person: Marina Dermastia marina.dermastia@nib.si
10. Agricultural University of Tirana, Albania Magdalena Cara mcara@ubt.edu.al	-Survey of alternative host plants and vectors in some areas of Albania -Landscape analysis and relation between alternative vectors and landscape composition

	-The control strategies with insecticide treatments Contact person: Magdalena Cara mcara@ubt.edu.al
11. Alma Mater University of Bologna, Italy Assunta Bertaccini assunta.bertaccini@unibo.it	-Genetic characterisations of the FD strains collected in the countries. Contact person: Assunta Bertaccini assunta.bertaccini@unibo.it

1.7. Research project partnership outside Euphresco

Euphresco funding ensures a certain level of transnational collaboration among Euphresco member countries. It is possible, if the funding consortium is interested, to contact funding organisations or research groups outside the geographical area covered by Euphresco members. The Euphresco coordinator could advertise the research topic in order to have an enlarged collaboration. If funders are interested in this possibility, please check the case below:

☒ The funding consortium of the topic mentioned in section 1.2 requires to advertise the topic outside the Euphresco network.

Information to sharpen the profile of sought partners could be useful (but not mandatory): country/region (if there are preferences), skills/expertise required, etc.

1.8. Any other relevant information on content

The present project starts from the results obtained in the Euphresco GRAFDEPI project, and develops further, exploiting its outcomes, in particular the surveillance scheme. Close collaboration in Switzerland with the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL) for the landscape analysis will be fundamental, as the collaboration with researchers of countries of the Euphresco Network that didn't express a direct interest at the first announcement and partners outside the Euphresco network.

List of the researchers of countries of Euphresco Network that didn't express a direct interest at the topic 2016-F-196. They have been chosen for their competence in the different WP

- **Spain**
  Researcher: Assumpico Batlle
  E.mail address: assumpcio.batlle@irta.cat
  Euphresco contact person: Anaisabel Delapena, National Institute for Agricultural Research and Food Technology

Countries outside Euphresco Network

- **Serbia**
  Organisation: Institute for Plant Protection and Environment
  Contact person: Milana Mitrović
  E.mail address: milanadesancic@yahoo.co.uk
- **Slovakia**
  Contact person: Ludovit Cagan
  E.mail address: ludovit.cagan@gmail.com

2. Euphresco management aspects of the project

2.1 Indication of the topic budget

Funding organisation [a]	Mechanism [b]	Total Budget [c]
1. AGES (AT)	NC	€ 61 250
2. BLW (CH)	NC	€
3. HCPHS (HR)	NC	€ 5 000
4. INRA (FR)	NC	€ 20 000
5. JKI (DE)	NC	€ 5 000
6. NFCSO (HU)	NC	€ 3 000
7. CREA (IT)	NC	€ 5 000
8. INIAV (PT)	NC	€ 38 179
9. MKGP (SI)	NC	€ 5 000
10. AUT (AL)	NC	€ 1 000
11. UNIBO (IT)	NC	€ 1 000
total		€

2.2 Expected duration of the project (only for non-competitive topics)

24 months.

2.3 Any other relevant information on topic organisation and management

[a] First member is project coordinator. A minimum of two partners are necessary for each proposal. Add lines as needed.
[b] Please indicate the preferred mechanism (e.g. real pot RP; virtual pot VP; non-competitive NC), or several mechanisms if there is flexibility.
[c] Optional, as this amount can still change in the next phase. In-kind contribution should also be indicated in this column.